

WHAT IS CLAIMED IS:

1. A process for preparing a polyether having one or more halogen, aldehyde, ketone or nitro groups, comprising forming a mixture of a halogenated, aldehyde-  
5 containing, ketone-containing or nitro-containing initiator compound having one or more oxyalkylatable groups, at least one alkylene oxide and from about 1100 to 10,500 parts by weight, based on the weight of the product, of a metal cyanide catalyst complex and subjecting the mixture to conditions sufficient to activate the catalyst complex and to alkoxyrate the oxyalkylatable groups of the initiator.
- 10 2. The process of claim 1 wherein the initiator compound is chlorinated or brominated.
3. The process of claim 2 wherein the alkylene oxide is ethylene oxide,  
15 propylene oxide or 1,2-butylene oxide.
4. The process of claim 3 wherein at least three moles of alkylene oxide are added per equivalent of initiator, and the polydispersity of the product is less than about 1.25.
- 20 5. The process of claim 2 wherein the initiator compound is 2-chloroethanol, 2-bromoethanol, 2-chloro-1-propanol, 3-chloro-1-propanol, 3-bromo-1-propanol, 1,3-dichloro-2-propanol, 1-chloro-2-methyl-2-propanol.
- 25 6. The process of claim 2 wherein the metal cyanide catalyst complex is used in an amount of from about 2000 to 10,000 parts by weight, based on the weight of the product, of a metal cyanide catalyst complex.
7. The process of claim 1 wherein the initiator compound contains one or more  
30 nitro groups.
8. The process of claim 7 wherein the alkylene oxide is ethylene oxide, propylene oxide or 1,2-butylene oxide.

9. The process of claim 8 wherein at least three moles of alkylene oxide are added per equivalent of initiator, and the polydispersity of the product is less than about 1.25.
- 5 10. A poly(alkylene oxide) polymer containing the residue of an initiator compound containing at least one halogen, aldehyde ketone or nitro group, the polymer having an average alkoxy degree of polymerization of at least three moles of alkylene oxide per equivalent of initiator compound.
- 10 11. The polymer of claim 10 which contains, prior to any clean-up or purification, no more than 5 weight percent of by-products other than unreacted starting materials and a high molecular weight fraction.
12. The process of claim 10 wherein the initiator compound is chlorinated or  
15 brominated.
13. The process of claim 11 wherein the alkylene oxide is ethylene oxide, propylene oxide or 1,2-butylene oxide.
- 20 14. The process of claim 13 wherein at least three moles of alkylene oxide are added per equivalent of initiator, and the polydispersity of the product is less than about 1.25.
15. The process of claim 14 wherein the initiator compound is 2-chloroethanol,  
25 2-bromoethanol, 2-chloro-1-propanol, 3-chloro-1-propanol, 3-bromo-1-propanol, 1,3-dichloro-2-propanol, 1-chloro-2-methyl-2-propanol.
16. The process of claim 11 wherein the initiator compound contains one or more nitro groups.
- 30 17. The process of claim 12 wherein the alkylene oxide is ethylene oxide, propylene oxide or 1,2-butylene oxide.

18. The process of claim 17 wherein at least three moles of alkylene oxide are added per equivalent of initiator, and the polydispersity of the product is less than about 1.25.

- 5 19. A process comprising forming a mixture of a halogenated initiator compound having one or more oxyalkylatable groups, at least one alkylene oxide and from about 2000 to about 10,000 ppm of a metal cyanide catalyst complex and  
10 subjecting the mixture to conditions sufficient to activate the catalyst complex and to alkoxyate the oxyalkylatable groups of the initiator to form a polyether containing at least one halogen group and at least one hydroxyl group, and then  
15 contacting said polyether with ammonia, a primary amine or a secondary amine under conditions sufficient to replace said halogen group with an amine group.

20. A process comprising forming a mixture of a nitro-containing initiator  
15 compound having one or more oxyalkylatable groups, at least one alkylene oxide and from about 2000 to about 10,000 ppm of a metal cyanide catalyst complex and  
20 subjecting the mixture to conditions sufficient to activate the catalyst complex and to alkoxyate the oxyalkylatable groups of the initiator to form a polyether containing at least one nitro group and at least one hydroxyl group, and then  
25 subjecting said polyether to conditions sufficient to reduce said nitro group to an amine group to form amino groups.